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PNS/FDA 31 (2010) (English): Recommended Code of Practice for the Processind and Handling of Tropical Fruit Wines

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PHILIPPINE NATIONAL STANDARD

PNS/FDA 31:2010
ICS 67.160.10

Recommended code of practice for the processing and handling of tropical fruit wines

DEPARTMENT OF TRADE & INDUSTRY PHILIPPINES

BUREAU OF PRODUCT STANDARDS

Member to the International Organization for Standardization (ISO)
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Contents **Page**

Foreword

The need for more standards for our Philippine ethnic foods transpired during the round table discussion on the processed food exports. The development of the standard aims to set the high standard of the product, provide guide for the assurance of its quality and safety, harmonize export requirements, and prepare the products to be more competitive in the world market.

The project entitled "Development of Standards for Ethnic Food Products" developed several food standards. One of these standards was the Standard for Tropical Fruit Wines and the Recommended Code of Practice for the Processing and Handling of Tropical Fruit Wines.

The development includes different phases among others the analysis of fruit wines conducted by the DOST-CAR Regional Standards and Testing Laboratory and the analysis of the container used done by the FDA.

The Standard was reviewed, finalized and endorsed for adoption by the Food and Drug Administration as the Philippine National Standard and Recommended Code of Practice.

Public consultation workshop was held in the Cordillera Autonomous Region where the production of the products is common. Concerned stakeholders from different agencies and offices attended the workshop and contributed their expertise for the finalization of the draft.

Recommended code of practice for the processing and handling of tropical fruit wines

1 Scope

This Code of Practice is concerned with the receipt of raw materials and ingredients, preparation and processing of tropical fruit wines as defined in this Code, in order to conform to the required standards stated in PNS/FDA No. 30:2010 Standards for Tropical Fruit Wines. The product may be prepared by fermentation of the juice and/or products of different tropical fruit varieties listed in, but not limited to, Annex A.

This Code is intended to provide guidelines to achieve compliance with the standards for tropical fruit wines packed in any suitable containers.

2 References

The titles of the standard publications referred to in this standard are listed on the inside back cover.

3 Definition of terms

For the purpose of this Code, the following definitions apply:

3.1
adjunct
it is the plant-derived product added to alcoholic beverages to contribute to their flavor and color

3.2
aging
it is the process of storing of wine in a sealed container after fermentation to improve its quality

3.3
Brix
it is the concentration of sugar in syrup corresponding approximately to concentration of solutes expressed in percentage as measured with a refractometer or hydrometer and expressed in ^{o}Brix units

3.4
container
it is any form of packaging material, which completely or partially encloses the food (including wrappers). A container may enclose the food as a single item or several units of types of prepackaged food when such is present for sale to the consumer

3.5
contaminant
it is any biological or chemical agent, foreign matter, or other substances that are not intentionally added to food, which may compromise food safety and suitability

3.6
current Good Manufacturing Practices (cGMP)
it is a quality assurance system aimed at ensuring that products are consistently manufactured, packed or repacked or held to a quality appropriate for the intended use. It is thus concerned with both manufacturing and quality control procedures

3.7
ethanol
it is light, volatile alcohol produced during fermentation of sugars

3.8
fermentation
it is a metabolic process of converting reducing sugars into ethanol by yeast (*Saccharomyces* spp.)

3.9
food
it is any substance, whether semi-processed or raw, which is intended for human consumption, and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of "food" but does not include cosmetics or tobacco or substances only used as drugs

3.10
food additive
it is any substance the intended use which results or may reasonably be expected to result, or indirectly, in its becoming a component or otherwise affecting the characteristics of any food (including substance for use in the producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding of food; and including any source of radiation intended for any such use), if such substance is generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown scientific procedures to be safe under the conditions of intended use (R.A. 3720. Food, Drug and Cosmetic Act)

3.11
food standard
it is a regulatory guideline that defines the identity of a given food product (i.e. its name and the ingredients used for its preparation) and specifies the minimum quality factors and when necessary, the required fill of the container. It may also include specific labelling requirements other than or in addition to the labelling requirements generally applicable to all prepackaged foods

3.12
ingredient
it is any substance including food additive, used as a component in the manufacture or preparation of a food and present in the final product in its original or modified form

3.13
label
it includes any tag, brand, mark, pictorial or other descriptive script, written, printed, marked, embossed or impressed on, or attached to the container

3.14
lot
it is food produced during a period of time and under more or less the same manufacturing condition indicated by a specific code

3.15
pasteurization
it is a heat treatment process applied to a product with the aim of avoiding public health hazards arising from pathogenic microorganisms. Pasteurization, as a heat treatment process, is intended to result in only minimal chemical, physical and sensory changes

3.16
packaging
it is the process of packing that is part of the production cycle applied to a bulk product to obtain a finished product. Any material, including printed material, employed in the packaging of a product including any outer packaging used for transportation of shipment. Packaging materials are referred to as primary or secondary according to whether or not they are intended to be in direct contact with the product

3.17
pH
it is the intensity or degree of acidity of a food material

3.18
processing aids
these are additives that are used in the processing of food to achieve a specific technological purpose and which may or may not result in the presence of residues or derivatives in the final product (BFAD A.O. No. 88-A s. 1984)

3.19
potable water
it is water fit for human consumption and potability determined by health authorities cited in Philippine National Standards for drinking water (Department of Health A. O. No. 2007-0012. Philippine National Standards for Drinking Water 2007)

3.20
refractometer
it is the instrument used to measure the percent soluble solids of sugars referred to as degree Brix (^{o}Bx); concentration of sugars expressed in terms of number of grains of sucrose per 100g of liquid

3.21
total acidity (of wine)
it is the sum of all titratable acidities of the wine when it is titrated to pH 7 against a standard alkaline solution; it is amount of organic acids derived from the raw materials or produced during alcoholic fermentation, and expressed as grams of acid per 100 mL of sample

3.22
volatile acidity (of wine)
it is the amount of steam-distillable acids present in the wine which is attributed to the growth of acetic acid bacteria and sometimes of yeasts; used as an indicator of spoilage and expressed as grams acetic acid per 100 mL of sample

3.23
wine
it is an alcoholic beverage produced by the natural fermentation of the juice of grapes or other fruits or of the fermentable parts of plant or plant-related products; it contains 7 to 24% alcohol by volume and may contain certain optional ingredients

4 Raw materials, ingredients, and packaging material requirements

4.1 Raw materials and ingredients – Raw materials for processing shall not contain parasites, microorganisms, toxins, and decomposed or extraneous substances.

4.1.1 Fruit juice – The fruit juice to be used shall be obtained from sound and mature fresh or processed fruits that are fit for human consumption.

4.1.2 Inoculum – The inoculum to be used to facilitate fermentation of fruit juice shall consist of yeast cells belonging to genus *Saccharomyces* and may include other fermenting microorganisms. It could be in the form of pure cultures on agar slants, or as active dry cells. It must not include substances and/or microorganisms that may inhibit fermentation or bring undesirable sensory and quality characteristics to the product.

4.1.3 Water – Only clean, potable water (Annex B) shall be used for the preparation and for all the pretreatment and processing steps of tropical fruit wine production. Non-potable water may be used only for operations not in direct contact with the food materials provided that this does not pose a hazard to health as determined and approved by the official agency having the jurisdiction over it.

4.1.4 Food additives – All additives shall conform to the food standards required by the BFAD and/or authority.

4.1.5 Optional Ingredients – Other food grade ingredients may be added during processing to achieve certain sensory and quality characteristics for tropical fruit wine. Only those which do not post a hazard to health may be added to the product.

4.2 Packaging materials – The packaging materials should be appropriate for the product to be packed and for the expected conditions of handling during distribution and storage. These must provide the products adequate protection from contamination and must be sufficiently durable to withstand mechanical, chemical and thermal stresses encountered during processing and normal distribution. All packaging materials must be clean and free from defects that may affect the product or package integrity. These shall be stored in a clean and sanitary manner.

Before filling, rigid containers shall be cleaned to prevent incorporation of foreign matter into the finished product. Closures may be cleaned before use, subject to the conditions of handling by the processors or suppliers.

Glass bottles and closures (caps or corks) – Only heat resistant glass bottles and closures shall be used. The glass bottles shall be properly inspected for presence of cracks, chips and other defects. These must be washed with clean water to eliminate dirt and foreign matter.

Closures must be free from scratches, dents and other defects. It must effect a hermetic seal after processing.

Glass bottles may be reused provided they are sound, and properly washed and sanitized. All closures shall never be re-used. Shrinkable plastic cap seals, when used, should fit the size of the closures and glass bottles, to prevent tampering and to provide protection from bottleneck contamination and other physical damage.

5 Hygiene

It is recommended that the product covered by the provisions of this code of practice be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969, Rev 4 (2003)) and/or the BFAD A.O. No. 153 s. 2004 - Guidelines, Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food, covering the plant facilities and operations requirement including the construction and layout of processing plant, hygienic facilities, equipment, utensils and working surfaces.

6 Preparation and processing of tropical fruit wines

6.1 Preparation of raw materials for tropical fruit wine production

6.1.1 Receipt of raw materials – Tropical fruits to be used, whether fresh or previously processed, shall only be accepted if they are sound and suitable for juice extraction. Those that show signs of deterioration shall not be used.

6.1.2 Inspection and sorting – The tropical fruits shall be inspected and sorted according to quality before processing. Sorting may be carried out on moving inspection belts or sorting tables.

6.1.3 Washing and/or cleaning – Fruits shall be washed to remove dust, dirt, insect, mold spores, plant parts and filth that might contaminate or affect its aroma or flavor. To be most effective and economical, washing with water must be accompanied with brushing, rubbing and forcing the water against the fruit skins and into crevices. Detergents are frequently used in the wash or rinse water.

6.2 Fruit juice preparation

6.2.1 Juice extraction – Peel the fruits if necessary, e.g. if skins and peels do not contribute to juice production and/or wine characteristics. Juice may be extracted in different ways depending on the type of fruit to be used. Pulping or mashing shall be done on fleshy fruits such as cashew, mango and pineapple. Squeezing shall be done on citrus fruits. Boiling with water shall be done on hard fruits such as guava or *santol*. Only properly-sanitized food grade equipment (juicers, pulpers, etc.) shall be used. If dried fruits are to be used as raw material, reconstitution (restoring moisture) should be done prior to juice extraction.

6.2.2 Filtration – Fruit juices not requiring the inclusion of pulp or skin during fermentation shall be filtered using a properly-sanitized cheese cloth or filter equipment immediately after extraction.

6.2.3 Determination and adjustment of total soluble solids – The initial total soluble solids of the juice should be determined using a refractometer. The initial total soluble solids of the juice should be at least 20 °Bx. Addition of water, sugar, juice, or food grade acid to the juice may be done to meet the said requirement.

6.2.4 Pasteurization – The juice shall be pasteurized at 63 °C for 30 minutes or any suitable time-temperature combination to prevent the proliferation of spoilage microorganisms during fermentation.

6.2.5 Cooling – The juice shall be immediately cooled to at least 40 °C after pasteurization to prevent inactivation of inoculum.

6.3 Fermentation

The fruit juice shall be transferred to any of the following but not limited to sterilized stainless steel, wooden oak, glass or earthenware fermentation containers as long as it is suitable for fermentation. Fermentation containers must be properly covered to prevent contamination. The beverage shall be allowed to ferment for at least one month, or until desired alcohol content has been reached. The minimum duration of fermentation is also to allow spent microbial cells and other sediments to settle at the bottom of the container. Fermentation temperature must be kept not lower than 19°C and not higher than 28 °C.

6.4 Filtration

The fermented wine must be filtered of spent microbial cells and remaining solid fruit material using a sanitized filter machine to clarify the wine and to halt fermentation.

6.5 Pasteurization

The filtered fermented wine may be pasteurized at 63 °C for 30 minutes or any time-temperature combination to inactivate spoilage microorganisms.

6.6 Aging

The wine shall fill properly sanitized glass, wooden oak, stainless steel, or earthenware containers at 1.5 cm to 2.5 cm below their cover. Containers should be tightly closed to avoid contamination and aeration. The aging period should be at least three (3) months. Racking, which is decanting the clear wine to another container may be done periodically during aging for clarification of the beverage.

6.7 Clarification

Food grade clarifying agents such as beaten egg albumin or sodium metabisulfite may be added the aged fruit wine to further reduce its turbidity. Such agents should not pose a hazard or negatively affect the sensory characteristics of the product. The fruit wine shall be filtered after clarification.

6.8 Filling of containers

The filling of containers, either mechanically or manually, shall be controlled so as to meet the specified filling requirements specified in the process. The minimum fill shall be at 1 inch below the cap or cork. It is important to standardize filling, not only for economic reasons, but because wine oxidation may occur due of excessive air inside the container.

6.9 Closing and sealing of containers

Closures shall be sealed air-tight to meet the requirements of the processors.

Self-sealing metal caps or lids shall be tightened and secured to each filled container.

To prevent leakage and contamination, the sealing surface shall be free of defects and damage. After closing, the caps must be essentially level, not cocked or tilted, and seated well down the finish. This will prevent damage caused by bumping of adjacent containers as they move along conveyors.

6.10 Coding of sealed containers

Coding of sealed container shall be indelible with details of production date and time, batch code, product code, the product line in which product is packed, the manufacturing plant and other information necessary for product traceability. Where the container does not permit the code to be embossed or inked, the label shall be legibly perforated or otherwise marked, and securely affixed to the product container.

6.11 Washing of sealed containers

Where necessary, filled and sealed containers shall be thoroughly washed to remove grease, dirt and product from the outside of the container.

7 Food additives

Food additives when used shall be in accordance with the regulations established by the Bureau of Food and Drugs (BFAD) (Bureau Circular No. 016 s.2006. Updated List of Food Additives), the Codex Alimentarius Commission and/or authority for these products.

The following food additives listed in, but not limited to, table 1, may be used for the manufacture of tropical fruit wines:

Table 1 – Food additives for tropical fruit wines (BC No. 016 s. 2006 Updated List of Food Additives)*

Function	Name	Maximum level
A. Acidity regulator	Calcium malate	GMP
	Calcium sulfate	2000 mg/kg
	Citric acid	700 mg/kg
	Fumaric acid	3000 mg/kg
	Lactic acid	GMP
	Malic acid (DL-)	GMP
	Potassium carbonate	5000 mg/kg
	Potassium dihydrogen citrate	3000 mg/kg (for use in cooler-type products only)
	Potassium hydrogen carbonate	5000 mg/kg
B. Antifoaming agent	Polydimethylsiloxane	10 mg/kg
C. Anticaking agent	Aluminum silicate	GMP
	Calcium aluminium silicate (synthetic)	GMP
	Silicon dioxide (amorphous)	17 mg/kg
	Sodium aluminosilicate	GMP
D. Antioxidant	Ascorbic acid	200 mg/kg
	Calcium ascorbate	GMP
	Erythorbic acid	GMP
	Ferrocyanides	GMP (as anhydrous sodium ferrocyanide)
	Glucose oxidase	GMP
	Mineral oil	GMP (for use as a float on fermentation fluid to prevent contamination)
	Potassium ascorbate	GMP
	Sodium ascorbate	200 mg/kg
	Sodium erythorbate	GMP

(Table 1 continued)

Function	Name	Maximum level
	Sorbates	2000 mg/kg (as sorbic acid)
	Tocopherols	150 mg/kg (for use in cooler-type products only)
	Tripotassium citrate	3000 mg/kg (use level reported as 25 lbs/1000 gal x (0.45 kg/lb) x (1 gal/3.75 L) x (1 L/kg) x (106mg/kg) = 3000 mg/kg)
E. Carbonating agent	Carbon dioxide	GMP
F. Color	Allura red AC	200 mg/kg
	Amaranth	30 mg/kg
	Annato extracts	GMP
	Azorubine	200 mg/kg
	Beet Red	GMP
	Brilliant black PN	200 mg/kg
	Brilliant blue FCF	200 mg/kg
	Brown HT	200 mg/kg
	Canthaxanthin	5 mg/kg
	Caramel Color, Class I	GMP
	Caramel Color, Class III	GMP
	Caramel Color, Class IV	GMP
	Carmines	200 mg/kg
	Carotenes, Vegetable	GMP
	Carotenoids	200 mg/kg
	Chlorophylls	GMP
	Chlorophylls, Copper complexes	GMP
	Curcuimin	200 mg/kg
	Grape skin extract	GMP
	Indigotine	200 mg/kg
	Iron oxides	GMP
	Ponceau, 4R	200 mg/kg
	Tannic acid (tannins, food grade)	200 mg/kg
G. Emulsifier/Stabilizer/ Thickener	Agar	GMP
	Bromelain	GMP
	Calcium alginate	4000 mg/kg
	Calcium carbonate	3500 mg/kg
	Carob Bean Gum	500 mg/kg
	Carrageenan	
	Diacetyltartaric and Fatty Acid Esters of Glycerol	GMP
	Ethyl maltol	100 mg/kg
	Gellan Gum	GMP
	Guar Gum	500 mg/kg

(Table 1 continued)

	Gum arabic	500 mg/kg
	Insoluble polyvinylpyrrolidone	7910 mg/kg (added level; residue not detected in ready-to-eat food)
	Karaya gum	500 mg/kg
	Konjac flour	GMP
	Maltol	250 mg/kg
	Microcrystalline cellulose	GMP
	Mono- and diglycerides	18 mg/kg
	Papain	GMP
	Pectins (amidated and nonamidated)	GMP
	Polyglycerol esters of fatty acids	500 mg/kg
	Polyglycerol esters of interesterified ricinoleic acid	1000 mg/kg
	Polyoxyethylene stearates	GMP
	Polyvinylpyrrolidone	60 mg/kg (residual level)
	Potassium alginate	GMP
	Powdered cellulose	GMP
	Processed eucheuma seaweed	GMP
	Sodium carboxymethyl cellulose	5000 mg/kg
	Sorbitan esters of fatty acids	GMP
	Tara gum	GMP
	Tragacanth gum	500 mg/kg
	Xanthan gum	GMP
H. Enzyme	Protease (*A. oryzae* var.)	GMP
I. Preservative	Benzoates	1000 mg/kg (as benzoic acid)
	Dimethyl dicarbonate	250 mg/kg (added level; residue not detected in ready-to-eat food)
	p-Hydroxybenzoates	200 mg/kg (as p-hydroxybenzoic acid)
	Lysozyme hydrochloride	500 mg/kg
	Phosphates	220 mg/kg (as phosphorus)
J. Propellant	Nitrogen	GMP (use as packing gas)
K. Sweetener	Acesulfame potassium	GMP
	Aspartame	700 mg/kg
	Saccharin	80 mg/kg

*Based on the food category system: 14.2.3 Wines, 14.2.4 Fruit Wines

8 Post-process handling procedures

To control post-process leakage contamination or leaker infection, processed containers shall be dried as soon as possible after processing so that exposure to post-wet conveying and handling equipment is minimized.

9 Inspection and labeling

9.1 Inspection of finished products

All processed products shall be inspected before labeling and casing and defective products shall be withdrawn or rejected. The company must have an approved policy and procedures based on the BFAD A.O. No. 153 s. 2004 - Guidelines, Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food.

9.2 Labeling

Labeling shall be done after the prescribed incubation period when the product has passed quality evaluation. All containers shall be properly labeled. The label shall conform to the rules and regulations of BFAD (A.O. 88-B s. 1984).

9.3 Tamper-evident seals

Use of tamper-evident seal is highly recommended.

10 Quality assurance

10.1 Record keeping

Permanent and legible dated records of time, temperature code mark and other pertinent details shall be kept concerning each load. Such records are essential as a check on processing operations.

Written records of all container closure examinations shall specify the code lot, the date and time of container closure inspections, the measurements obtained and all the corrective actions taken.

Records shall be maintained identifying initial distribution of the finished product to facilitate, if necessary, the segregation of specific food lots that may have been contaminated or otherwise unfit for intended use.

All process deviations involving failure to satisfy the minimum requirements of the process shall be recorded detailing those deviations and the actions taken.

10.2 Deviations in processing

Whenever in-process monitoring records disclose that a product has a deviation from the process, the processor shall:

10.2.1 Identify, isolate and then reprocess that portion of the production involved. Complete reprocessing records shall be retained; or

10.2.2 Set aside that portion of the product involved for further evaluation as to any potential public health significance. Such evaluation shall be made by competent authority and shall be in accordance with recognized procedures. A record shall be made of the evaluations made and the results. After the determination that no significant potential for health hazards exists, that portion of the product involved may be distributed. Otherwise, that portion of the product shall be destroyed.

All process deviations involving failure to satisfy the minimum requirements of the process shall be recorded detailing those deviations and the actions taken.

10.3 Good manufacturing practices (GMP)

The processing establishments shall develop and implement programs based on BFAD's current good manufacturing practices (cGMP) and hygiene control.

11 Storage and transport of finished product

Storage and transport conditions of the finished product shall be such that the integrity of the product container, and the safety and quality of the product are not adversely affected.

Cases and cartons must be thoroughly dry. They must be of proper size so that the containers fit snugly and are not subject to damage from movement within the case. They must be strong enough to withstand normal transport.

Extreme temperature fluctuations during storage and transport of the product must be avoided to prevent product deterioration.

12 Laboratory control procedures

Each food processing establishment shall have access to laboratory control of both the processes used and the finished products. All food ingredients and food products declared unfit for human consumption by the laboratory shall be rejected.

Representative samples for each lot or batch shall be taken to assess the safety and quality of the product.

Microbiological laboratory shall be separated from the processing area. No pathogens shall be handled within the premises of manufacturing plant.

Laboratory procedures for quality control of the processes and the product must follow recognized or standard methods for easy interpretation of results.

13 End product specifications

Appropriate methods shall be used for sampling analysis and determinations to meet the following specifications:

13.1 To the extent possible in good manufacturing practices, the products shall be free from any objectionable characteristics.

13.2 The product shall not contain any pathogenic organisms or any toxic substances originating from microorganisms.

13.3 The product shall be free from chemical pollutants in amounts which may represent hazard to health.

13.4 The product shall comply with the requirements set forth by the Bureau of Food and Drugs, the Fertilizer and Pesticide Authority of the Department of Agriculture, and the Codex Alimentarius Commission on Pesticide Residues and Food Additives.

Annex A

Tropical fruit varieties grown in the Philippines*

Common name(s)	Scientific name
Avocado	*Persea americana* Mill.
Bago	*Gnetum gnemon* Linn.
Banana / *Saging*	*Musa acuminata*
Bilimbi / *Kamias*	*Averrhoa bilimbi* Linn.
Biriba	*Rollinia deliciosa* Saff.
Blueberry	*Vaccinium pallidum*
Breadfruit / *Rimas*	*Artocarpus altilis* (Park.) Fosb.
Breadnut / *Kamansi*	*Artocarpus camansi* Blanco
Canistel / *Tiessa*	*Lucuma nervosa* A.DC.
Cashew / *Kasuy*	*Anacardium occidentale* Linn.
Chinese Laurel / *Bignay*	*Antidesma bunius* Linn.
Datiles	*Mintingia calabura* Linn.
Durian	*Durio zibethinus* Murr.
Galo	*Anacolosa luzoniensis* Merr.
Governor's Plum / *Bitungol*	*Flacourtia indica* (Burm. f.) Merr.
Granadilla	*Passiflora quadrangularis* Linn.
Guava / *Bayabas*	*Psidium guajava* Linn.
Jackfruit / *Langka*	*Artocarpus heterpophyllus* Lam.
Java Apple / *Makopa*	*Syzygium samarangense* (Blume) Merr. Perry
Java Plum / *Duhat*	*Syzygium cumini* (Linn.) Skeels
Jujube / *Manzanitas*	*Ziziphus jujube* (Linn.) Lam.
Kalumpit	*Terminalia microcarpa* Dence
Lanzones	*Lansium domesticum* Cor.
Lemon / *Limon*	*Citrus limoneia* Osbeck
Lipoti	*Eugenia polycephaloides* C. B. Rob.
Mango / *Mangga*	*Mangifera indica* Linn.
Mangosteen	*Garcinia mangostana* Linn.
Manila Tamarind / *Kamachile*	*Pithecellobium dulce* (Roxb.) Benth.
Marang	*Artocarpus odoratissima* Blanco
Marmalade Plum / *Chico-mamey*	*Poteria sapota* (Jacq.) Moore and Stearn
Melon	*Cucumis melo*
Mountain Apple / *Yambo*	*Syzygium malaccensis* (Linn.) Merr. And Perry
Orange / *Dalandan*	*Citrus aurantium* Linn.
Paho	*Mangifera philippinensis* Mukh.
Papaya	*Carica papaya* Linn.
Passion Fruit / *Pasionaria*	*Passiflora edulis* Sims.
Pineapple / *Pinya*	*Ananas comosus* (Linn.) Merr.
Rambutan	*Nephelium lappaceum* Linn.
Santol	*Sandoricum koetjape* (Burm. f.) Merr.

(table A continued)

Common name(s)	Scientific name
Sapodilla / *Chico*	*Achras zapota* Linn.
Sour sop / *Guyabano*	*Annona muricata* Linn.
Spanish Plum / *Siniguelas*	*Spondia purpurea* Linn.
Star Apple / *Kaimito*	*Chrysophyllum cainito* Linn.
Star fruit / *Balimbing*	*Averrhoa carambola* Linn.
Strawberry	*Fragaria ananassa*
Sugar apple / Sweet Sop / *Atis*	*Annona squamosa* Linn.
Tamarind / *Sampaloc*	*Tamarindus indica* Linn.
Velvet Apple / *Mabolo*	*Diospyros discolor* Willd.
Watermelon / *Pakwan*	*Citrillus vulgaris* Schrad.

* Other tropical fruit varieties may be used provided that they conform to the standards stated herein.

References:

Coron, R. E. 1983. **Promising Fruits of the Philippines.** Laguna, Philippines: University of the Philippines Los Banos, College of Agriculture.

Food and Nutrition Research Center. 1966. **Manual on Food Preservation and Processing Recommended for Use in the Philippines.** Manila: National Science Development Board Printing Press.

Annex B

Standard parameters and values for drinking water*

Table B.1 – Standard methods of detection and values for microbiological quality

Parameters	Method of determination	Value[a]	Units of measurement	Point of compliance
Total coliform	Multiple tube fermentation technique (MTFT)	< 1.1	MPN/100 mL	• Service reservoirs • Water treatment works • Consumer's taps • Refilling stations • Water haulers • Water vending machines
	Chromogenic substrate test (Presence-Absence)*	Absent < 1.1	 MPN/ 100 mL	
	Membrane filter technique (MFT)	< 1	Total coliform colonies / 100 mL	
	Compliance to total coliform			
	(a) For water systems analyzing at least 40 samples per month, no more than 5 % of the monthly sample may be positive for total coliform; (b) For water systems analyzing fewer than 40 samples per month, no more than one (1) sample per month may be positive for total coliform			• Consumer's taps
	At least 95 % of standard samples taken in each year fro each reservoir are total coliform negative			• Service reservoirs
	No standard sample taken from each month should exceed above maximum allowable value specified in the above.			• Water treatment works • Refilling stations • Water haulers • Water vending machines
Fecal coliform	Multiple tube fermentation technique (MTFT)	< 1.1	MPN / 100 mL	• Service reservoirs • Water treatment works • Consumer's taps • Refilling stations • Point sources (Level I) • Water haulers • Water Vending Machines
	Membrane filter technique (MFT)	< 1	Fecal coliform colonies/ 100 mL	
	Chromogenic substrate test (Presence-Absence)*	< 1.1	MPN/ 100 mL	

(Table B.1 continued)

Parameters	Method of determination	Value[a]	Units of measurement	Point of compliance
Heterotrophic plate count	• Pour plate • Spread plate • Membrane filter technique	< 500	CFU/mL	• Service reservoirs • Water treatment works • Consumer's taps nearest the meter • Refilling stations • Water vending machines
[a]Should be validated and approved by the Department of Health				

Table B.2 – Standard values for physical and chemical quality for acceptability aspects

Constituent	Maximum Level (mg/L) or Characteristic
Taste	No objectionable taste
Odor	No objectionable odor
Color (Apparent)	10 Color Units
Color (True)	5 Color Units
Turbidity	5 NTU
Aluminum	0.2
Chloride	250.0
Copper	1.0
Hardness	300 as $CaCO_3$
Hydrogen sulfide	0.05
Iron	1
Manganese	0.4
pH	6.5 – 8.5, or 5 - 7[b]
Sodium	200
Sulfate	250
Total dissolved solids	500, or < 10[b]
Zinc	5.0
[b] For product water that undergone reverse osmosis or distillation process.	

*Sec.2 **Philippine National Standards for Drinking Water 2007**. Department of Health, Manila.

Annex C

Measurement of pH of wines

A. Preparation of potassium hydrogen tartrate buffer solution (Saturated solution at 25 °C, 0.034 M)

Add excess (ca 100 %) of $KHC_4H_4O_6$ (NIST SRM 188) to H_2O in glass-stoppered bottle or flask, and shake vigorously; few minutes of shaking is for saturation (100 mL H_2O at 25 °C dissolves ca. 0.7 g $KHC_4H_4O_6$). Adjust to 25 °C, let solid settle, and decant clear solution, or filter if necessary. Discard when mold appears. Few crystals of thymol added during preparation will retard mold growth, and will alter pH by unit. For accuracy of ±0.01 pH unit, temperature of solution must be between 20 °C and 30 °C.

B. Calibration of pH meter

Let pH meter with glass and calomel electrodes warm up before use according to manufacturer's instructions. Check meter with freshly prepared, saturated, aqueous solution of $KHC_4H_4O_6$. Adjust meter to read 3.55 at 20 °C, 3.56 at 25 °C.

C. Determination of pH of sample

Rinse electrodes free of bitartrate by dipping in H_2O and then in sample. Place electrodes in fresh sample, determine temperature, and read pH to nearest 0.01 unit.

Annex D

Determination of volatile acidity

A. Apparatus

(a) ***Steam distillation apparatus*** – See Figure 960.16 (see 26.1.32) of the AOAC Manual.

(b) ***Cash electric still*** – See figure 964.08 of the AOAC Manual. Consists of outer chamber, inner chamber, trap, 2-way stopcock, electric coil heater, and glass "T" outlet for H_2O. All parts are of Pyrex. Residue in inner chamber after distillation is flushed out automatically by vacuum action when current is shut off. Addition of H_2O through funnel above stopcock gives automatic spray bath to inner chamber, and waste drains through outlet in glass "T". Two-way stopcock permits introduction of sample, serves as escape vent for CO_2, and allows introduction of wash H_2O.

B. Preparation of sample

Remove dissolved CO_2 from ca. 50 L sample by either: placing under low vacuum (H_2O aspirator) 2 min with continuous stirring; or bringing to incipient boiling under air condenser and cooling immediately.

C. Determination

(a) ***Steam distillation apparatus*** – Add ca 600 L boiled H_2O to outer chamber of still. Pipet 25 mL freshly prepared sample into inner chamber and stopper. Boil H_2O 3 in with sidearm open. Close and distill ca 300 mL into Erlenmeyer. Add 0.5 mL phenolphthalein to distillate and titrate rapidly with 0.1N NaOH until pink persists 15s. express results as g CH_3COOH/100 mL = mL 0.1N NaOH x 0.006 x 4.

(b) ***Cash electric still*** – Add H_2O and pipet sample as in (a). Rinse funnel with ca 5 mL H_2O. Distill ca 300 mL into Erlenmeyer. Titrate and express results as in (a). (Disconnect heating coil immediately and empty still by opening drain tube to outer chamber and stopcock to inner tube. Rinse still with two 10 mL-15 mL portions H_2O by adding through funnel; evacuate each portion through drain tube.)

Annex E

Determination of titratable acidity in wines

Remove CO_2 if present, by either of the following methods:

(1) Place ca 25 mL sample in a small Erlenmeyer flask and connect to H_2O aspirator. Agitate 1 in under vacuum; or

(2) Place ca 25 mL sample in a small Erlenmeyer flask, heat to incipient boiling and hold 30 s, swirl, and cool.

Add 1 mL phenolphthalein indicator solution to 200 mL hot, boiled H_2O in 500 mL wide-mouth Erlenmeyer flask. Neutralize to distinct pink. Add 5.00 mL degassed sample and titrate with 0.1 N standardized NaOH to same end point, using well-illuminated white background.

To express titratable acidity as grams of predominant acid per 100 mL of wine,

g / 100 mL = mL NaOH x normality of NaOH x F x 100/5

where

F is the factor appropriate to the predominant acid in the wine; 0.067 for malic acid, 0.045 for oxalic acid, 0.075 for tartaric acid, 0.090 for lactic acid.

Annex F

Determination of total soluble solids

A. Apparatus

(a) ***Hand refractometer*** – With scale reading of 0-35 ° Brix

B. Standardization of refractometer

Adjust instrument to read *n* of 1.3330 of 0 % sucrose with H_2O at 20 °.

C. Preparation of sample

Bring the sample to a temperature close to 20 °C, then filter to remove it of any undissolved solids.

D. Determination

Place sufficient amount of sample on the prism of the instrument, taking care that the sample covers the glass surface uniformly. Determine the total soluble solids by direct reading in terms of °Brix.

Annex G

Determination of alcohol by volume from specific gravity

A. Distillation of sample

Measure 100 mL original material into 300-500 mL distillation flask, noting temperature, and add 50 mL water. Attach flask to vertical condenser by means of bent tube, distill almost 100 mL, and dilute to 100 mL at same temperature. (Foaming, which sometimes occurs, especially with young wines, may be prevented with by adding a small amount of antifoam material) For wines that contain an abnormal amount of CH_3COOH, neutralize exactly with 1N NaOH solution before proceeding with distillation (unnecessary for wines of normal taste and odor).

B. Calibration

Fill thoroughly cleaned pycnometer with recently distilled water, stopper, and immerse in constant temperature water bath with bath level above graduation mark on pycnometer. After 30 min, remove stopper and with capillary tube adjust until bottom of meniscus is tangent to graduation mark. With small roll of filter paper, dry inside neck of pycnometer, stopper, and immerse in water at room temperature for 15 min. Remove pycnometer, dry, let stand 15 min, and weigh. Empty pycnometer, rinse with acetone, and dry thoroughly in air with suction. Let empty flask come to room temperature, stopper, and weigh.

Weight of water = weight of pycnometer + water – weight of empty pycnometer

C. Determination of specific gravity at room temperature

1. Determine weight of sample as in B.

Weight of sample = weight of pycnometer + distillate – weight of empty pycnometer

2. Calculate specific gravity as follows:

Specific gravity = SW,

where

S is theweight of sample; and
W is the weight of water.

D. Determination of alcohol

Obtain corresponding % alcohol by volume from Appendix C: Reference Volumes 913.02. AOAC Manual. 16th ed.

The following referenced documents are indispensable for the application of the document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

A.O. No. 153 s. 2004. **Guidelines, Current Good Manufacturing Practice in Manufacturing, Packing, Repacking or Holding Food.** Bureau of Food and Drugs. Department of Health. Alabang, Muntinlupa City, Philippines.

A. O. No. 88-B s. 1984. **Rules and Regulation Governing the Labeling of Prepackaged of Food Products Distributed in the Philippines.** Bureau of Food and Drugs. Department of Health. Alabang, Muntinlupa City, Philippines.

A. O. No. 2007-0012. **Philippine National Standards for Drinking Water 2007.** Department of Health, Manila, Philippines

Association of Analytical Chemists. **Official Methods of Analysis Manual.** 16th ed., 1995. 481 North Frederick Ave., Suite 500, Gaithersburg, MD 20877-2417. USA.

Codex Standard 192-1995. **General Standard for Food Additives.** Codex Alimentarius Commission. Food and Agriculture Organization. Viale delle Terme di Caracalla, 00100 Rome, Italy.

Fertilizer and Pesticide Authority. 2007. **List of Agricultural Pesticide Products as of 31 December 2007.** Department of Agriculture, Philippines.

Fertilizer and Pesticide Authority. 2007. **List of Fully Registered Fertilizer (Finished Products/Raw Materials) as of 31 December 2007.** Department of Agriculture, Philippines.

Food and Nutrition Research Center. 1966. **Manual on Food Preservation and Processing Recommended for Use in the Philippines.** Manila: National Science Development Board Printing Press.

Food Standards Australia and New Zealand. http://www.foodstandards.gov.au/

Food, definition. ALINORM 04/24/41, para. 88 and Appendix VI. 2005. Codex Alimentarius Commission. Food and Agriculture Organization. Vialle delle Terma di Caracalla, 00100 Rome, Italy.

Fruit Wines of Canada. 2000. **Fruit Wines of Canada National Quality Standards and Regulations.** Available from: http://www.fruitwinesofontario.ca/docs/qstandards.pdf

M. C. No. 13 s. 1989. **Methanol Content in Alcohol Beverages as Defined by Memo Circular 88-003.** Bureau of Food and Drugs. Department of Health. Alabang, Muntinlupa City, Philippines.

PNS/BFAD No. 12 s.2007. **Recommended Code of Practice for the Processing and Handling of Citrus Beverage Products.** Bureau of Food and Drugs. Department of Health. Alabang, Muntinlupa City, Philippines.

R. A. 3720. **Food, Drug and Cosmetic Act.** Bureau of Food and Drugs. Department of Health. Alabang, Muntinlupa City, Philippines.

Amerine, M. A. and Ough, C. S. 1972. **The Technology of Wine Making.** Westport, Connecticut: AVI Publishing Co.

Amerine, M. A. and Ough. C. S. 1974. **Wine and Must Analysis.** New York: John Wiley and Sons.

Coron, R. E. 1983. **Promising Fruits of the Philippines.** Laguna, Philippines: University of the Philippines Los Banos, College of Agriculture.

Department of Science and Technology Region 10. 2008. **Wine Making.** Available from: http://region10.dost.gov.ph/index.php?option=com_content&task=view&id=134&Itemid=76

Sanchez, P. 1989. **Tropical Wine Production: a courseware of the Technology Correspondence Program, Technology and Livelihood Resource Center.** Makati City : Technology and Livelihood Resource Center.

The International Framework for Food Description. Available from: www.langual.org.

FORMULATING BODY
Development of Standards for Tropical Fruit Wines

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